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PROCEDURE FOR GENERATING GLOBAL ATMOSPHERIC ENGINE EMISSIONS DATA FROM FUTURE SUPERSONIC TRANSPORT AIRCRAFT

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1990 HIGH SPEED CIVIL TRANSPORT STUDIES

ADVANCED AIRCRAFT TRANSPORTS
HIGH SPEED CIVIL TRANSPORT GROUP

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ABSTRACT

The input for global atmospheric chemistry models has been generated for baseline HSCT configurations at Mach 1.6, 2.2, and 3.2. The input is supplied in the form of number of molecules of specific exhaust constituents injected into the atmosphere per year by latitude and by altitude (for 2-D codes). Seven exhaust constituents are currently supplied-NO, NO_2 CO, CO_2, H_2O, SO_2, and THC (trace hydrocarbons). An eighth input is also supplied, NO_x, which is the sum of NO and NO_2. The number of molecules of a given constituent emitted per year is a function of the total fuel burned by a supersonic fleet and the emissions index (EI) of the aircraft engine for the constituent in question. The emissions indices for an engine are supplied directly by the engine manufacturer. The annual fuel burn of a supersonic fleet is calculated from aircraft performance and economic criteria, both of which are strongly dependent on basic design parameters such as speed and range. The altitude and latitude distribution of the emissions is determined based on 10 IATA regions chosen to define the worldwide route structure for future HSCT operations, and the mission flight profiles for the city-pairs representing each of the 10 regions.

INTRODUCTION

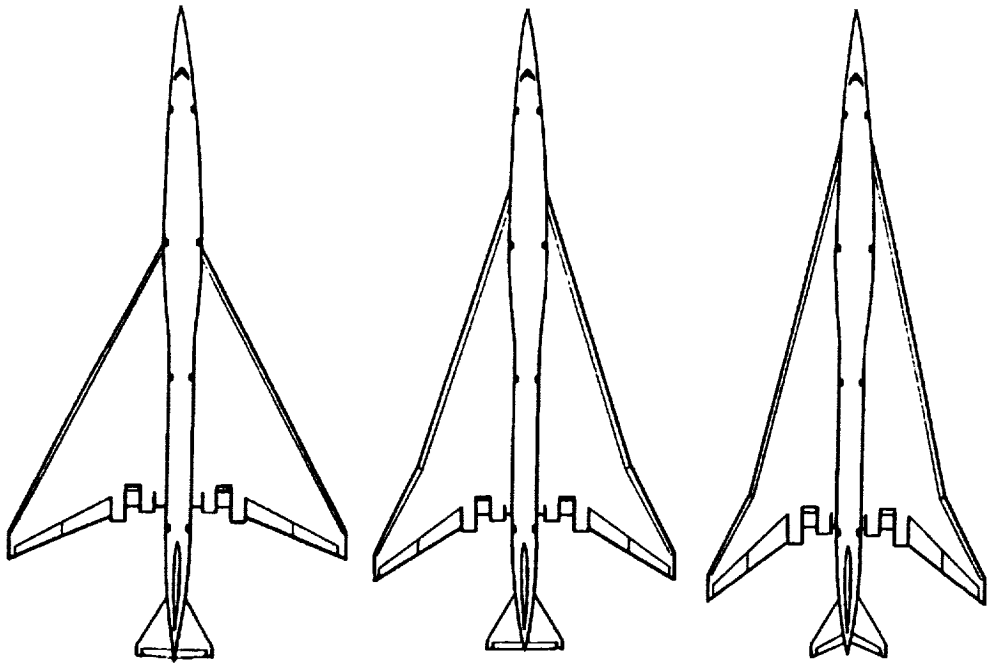
The potential for reduction of stratospheric ozone from emissions of nitrogen oxides (NO_x) in aircraft engine combustion processes is one of the primary environmental considerations for future High Speed Civil Transports (HSCTs). The process for estimating the atmospheric ozone impact of a given operating scenario can be divided into the prediction of exhaust constituent injection quantities by altitude and latitude, and the estimation of changes in global ozone concentration for the injections.

The estimation of changes in global ozone concentration is performed with complex computer models that calculate all the relevant atmospheric chemical reaction rates and transport mechanisms over a global grid. A discussion of these atmospheric models is beyond the scope of this report. Several of these models are currently in use and are undergoing validation.

In order to accurately predict the potential impact of the engine emissions from a fleet of HSCTs on the concentration of atmospheric ozone it is essential to have an accurate estimate of how much NO_x and other exhaust constituents will be injected into the atmosphere, as well as the altitude and latitude of injection. A detailed procedure has been developed at the Douglas Aircraft Company (DAC) to calculate the total annual fuel burn from an HSCT fleet by altitude and latitude. This data can be used to determine the number of molecules of NO_x and other trace constituents based on engine company estimates of the emission indices.

The amount of fuel burned is determined by economic and aircraft performance parameters. These parameters are interrelated and must be accurately predicted or wide variations in fuel burn can occur. For instance, a high marketing estimate of passenger demand will lead to more flights, and hence more fuel burn, just as a high estimate in aircraft drag will result a higher fuel burn. The complexity of the parameter interrelatedness is seen in that a high estimate in aircraft drag will also lead to higher operating costs, higher ticket prices, and a decrease in passenger demand — thus moving towards a lower fuel burn. These contrasting trends for an apparently simple parameter like aerodynamic drag illustrate the complexities involved in estimating the total annual fuel burn from a supersonic aircraft fleet.

The procedure for generating global atmospheric inputs described below has been applied to baseline HSCT designs at Mach 1.6, 2.2, and 3.2. A general description of these configurations and a planform drawing are shown in Figure 1.



MACH NO.	1.6	2.2	3.2
TOGW (LB)	818,284	823,521	860,120
BLOCK FUEL (LB)	451,907	442,657	452,449
RANGE (N MI)	6,500	6,500	6,500
PASSENGERS	300	300	300
ENGINE TYPE	P&W TBE – JET "A" FUEL	P&W TBE – JET "A" FUEL	P&W TBE – JP7 FUEL

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FIGURE 1. BASELINE HSCT CONFIGURATIONS FOR ENGINE EMISSIONS STUDY

PROCEDURE

The overall procedure and data flow for generating the annual fuel burn results and input for global atmospheric chemistry models is shown in Figure 2. In this figure the data is broken down to the most basic parameters (those shaded in gray) to illustrate how one parameter can affect several others. In a general sense the procedure shown in Figure 2 can be thought of as consisting of three basic steps:

1. estimate of location (altitude x latitude) of fuel burn,
2. estimate of amount of fuel burn, and
3. calculation of NOx molecules (and other constituents) from engine company emission indices.

These steps are explained in detail below.

1. Estimate of Location (Altitude x Latitude of Fuel Burn)

The latitude and altitude of exhaust injection is a function of the worldwide route structure assumed for future HSCT operations and the mission flight profiles of the global flights. The HSCT will compete in the long-range passenger market. This, combined with passenger traffic forecasts and overland operation concerns, led to the selection of 10 IATA regions (out of 18 total worldwide) that appear to be appropriate for supersonic transport aircraft operation. For each of these 10 regions a city pair was selected that best represents the average range and latitude distribution of flights in that region. The 10 regions and the corresponding city pairs are shown in Figure 3.

A flight profile for the HSCT configuration under study is generated for each of the ten city pairs. The flight profile is three-dimensional in downrange distance by altitude by latitude space, with great circle flight profiles. As can be seen in Figure 3, seven of the 10 routes can be considered overwater flights, while three are predominantly overland. The flight profiles (and fuel burns) for the overland routes do not account for operational procedure modifications (i.e., subsonic overland), nor are the flight paths altered to avoid overland operation. This is considered to be appropriate for the generation of baseline configuration data. This procedure can be modified for specific cases to include subsonic overland operation and/or flight path re-routing.

2. Estimate of Total Fuel Burn

The total fuel burn in a given region is a function of the passenger demand and load factor (i.e., percentage of seats occupied on a given flight) projected for that region. The number of flights per year is then calculated by dividing the total fuel burn by the fuel burn of a single flight. The fleet size can then be determined based on the number of flights, aircraft speed, and turnaround time. The competitive position of an HSCT with respect to the subsonic fleet is determined by contrasting the fare premium associated with supersonic flight with the time savings available through it. The time savings for a given flight is a function of the average speed and total distance of the flight. Thus, in the Mach 1-3 regime, the passenger demand for an HSCT increases with increasing cruise speed and range. The total annual fuel burns and load factors by region for the three

HSCT baseline configurations are shown in Table 1. The fuel burn data has been forecast for the year 2005 with the fleet sizes shown in the table.

In order to arrive at the most conservative scenario for emissions (i.e., largest fuel burns) it was decided to assume a zero fare premium for HSCT flights. This results in a 50 percent market capture in the 10 regions under consideration. The supersonic fleet market capture is limited by the presence of the existing subsonic fleet that will continue operation.

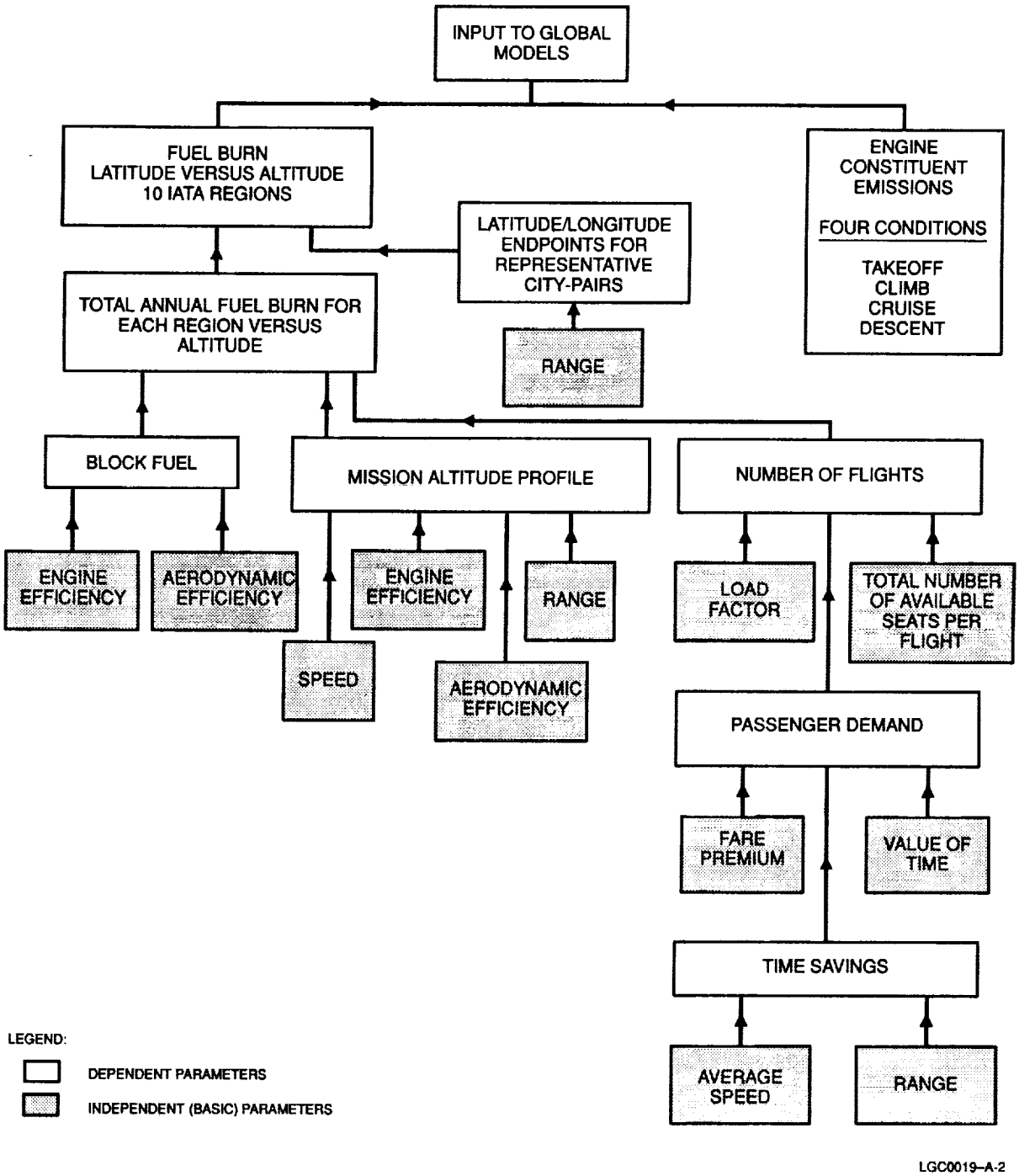
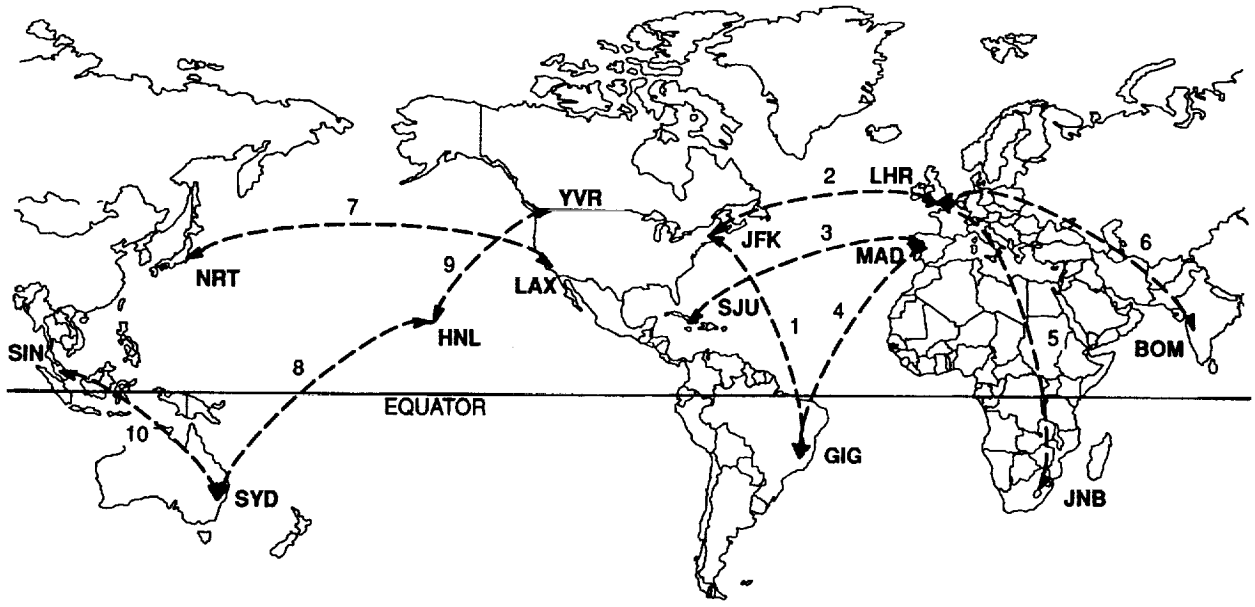


FIGURE 2. DATA FLOW FOR GENERATING INPUTS TO GLOBAL ATMOSPHERIC MODELS



REGION		CITY-PAIRS
1	NORTH-SOUTH AMERICA	NEW YORK – RIO DE JANEIRO (JFK-GIG)
2	NORTH ATLANTIC	NEW YORK – LONDON (JFK-LHR)
3	MID-ATLANTIC	SAN JUAN – MADRID (SJU-MAD)
4	SOUTH ATLANTIC	RIO DE JANEIRO – MADRID (GIG-MAD)
5	EUROPE AFRICA	JOHANNESBURG – LONDON (JNB-LHR)
6	EUROPE FAR EAST	BOMBAY – LONDON (BOM-LHR)
7	NORTH AND MID-PACIFIC	LOS ANGELES – TOKYO (LAX-NRT)
8	SOUTH PACIFIC	HONOLULU – SYDNEY (HNL-SYD)
9	INTRA-NORTH AMERICA	HONOLULU – VANCOUVER (HNL-YVR)
10	INTRA-FAR EAST AND PACIFIC	SINGAPORE – SYDNEY (SIN-SYD)

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FIGURE 3. HSCT REPRESENTATIVE CITY-PAIRS

TABLE 1
TOTAL ANNUAL FUEL BURNS BY REGION FOR HSCT BASELINE CONFIGURATIONS

REGION		LOAD FACTOR (%)	TOTAL ANNUAL FUEL BURN (1,000 LB)		
			MACH 1.6 FLEET SIZE = 436	MACH 2.2 FLEET SIZE = 440	MACH 3.2 FLEET SIZE = 363
1	NORTH-SOUTH AMERICA	63	1,729,683	1,735,965	1,864,158
2	NORTH ATLANTIC	69	20,029,856	20,168,417	21,774,906
3	MID-ATLANTIC	70	1,445,233	1,453,201	1,565,055
4	SOUTH ATLANTIC	70	2,262,795	2,255,509	2,393,155
5	EUROPE – AFRICA	61	4,339,257	4,391,955	4,791,598
6	EUROPE – FAR EAST	79	6,805,747	6,814,642	7,283,205
7	NORTH AND MID-PACIFIC	73	23,992,917	23,934,467	25,411,599
8	SOUTH PACIFIC	73	2,612,146	2,618,516	2,806,374
9	INTRA-NORTH AMERICA	68	159,673	163,504	182,052
10	INTRA-FAR EAST AND PACIFIC	72	10,390,713	10,527,488	11,487,475

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Once the total fuel burn by region has been determined, it is superimposed on the three-dimensional route structure grid determined from Step 1. This results in 10 matrices, each containing the annual fuel burn data by altitude and latitude for one of the IATA regions. These matrices are summed together to produce one matrix containing the total annual global fuel burn for an HSCT fleet by latitude and altitude.

3. Calculation of NO_x Molecules

The calculation of NO_x molecules in a given altitude, latitude grid cell is a relatively simple calculation based on the NO_x emission index ($EINO_x$) of the engine under the appropriate operating conditions. The operating condition of the engine varies considerably over the flight profile, and hence it is not desirable to simply apply one $EINO_x$ (e.g., cruise) over the entire flight regime. To a first order approximation, the engine cycle can be thought of as varying with downrange distance or altitude. There are essentially four stages to an HSCT mission profile:

1.	takeoff, subsonic climb	0-10 km	Based on Mach 3.2 mission
2.	supersonic climb	10-18 km	
3.	cruise	18-30 km	
4.	descent, idle	30-0 km	

These components are illustrated in Figure 4. The engine operating cycles approximately correspond to these four conditions.

In order to more accurately map out the injection of NO_x and other constituents into the atmosphere, a different set of emission indices is used for each of the four conditions. These are stratified by altitude except for descent, which spans all of the flight altitudes from the top of cruise to ground level. In order to account for this overlap, the constituent emission indices for descent are factored into the takeoff, climb, and cruise indices based on the ratio of time spent in a particular altitude band while descending. The ratios are based on a Mach 3.2 mission and are shown in Table 2.

Eight indices are used to characterize the constituent emissions of an HSCT combustor — $EINO_x$, EINO, $EINO_2$, EICO, $EICO_2$, EIH_2O, $EISO_2$, and EITHC (trace hydrocarbons). These indices are supplied by the engine manufacturers for a range of engine operating conditions. The appropriate operating cycles are then selected based on the HSCT aircraft mission performance data for the four stages of the mission. The ratios from Table 2 are applied, resulting in three sets of indices for the stratified altitude bands. These emission indices for the baseline HSCT configurations are shown in Table 3.

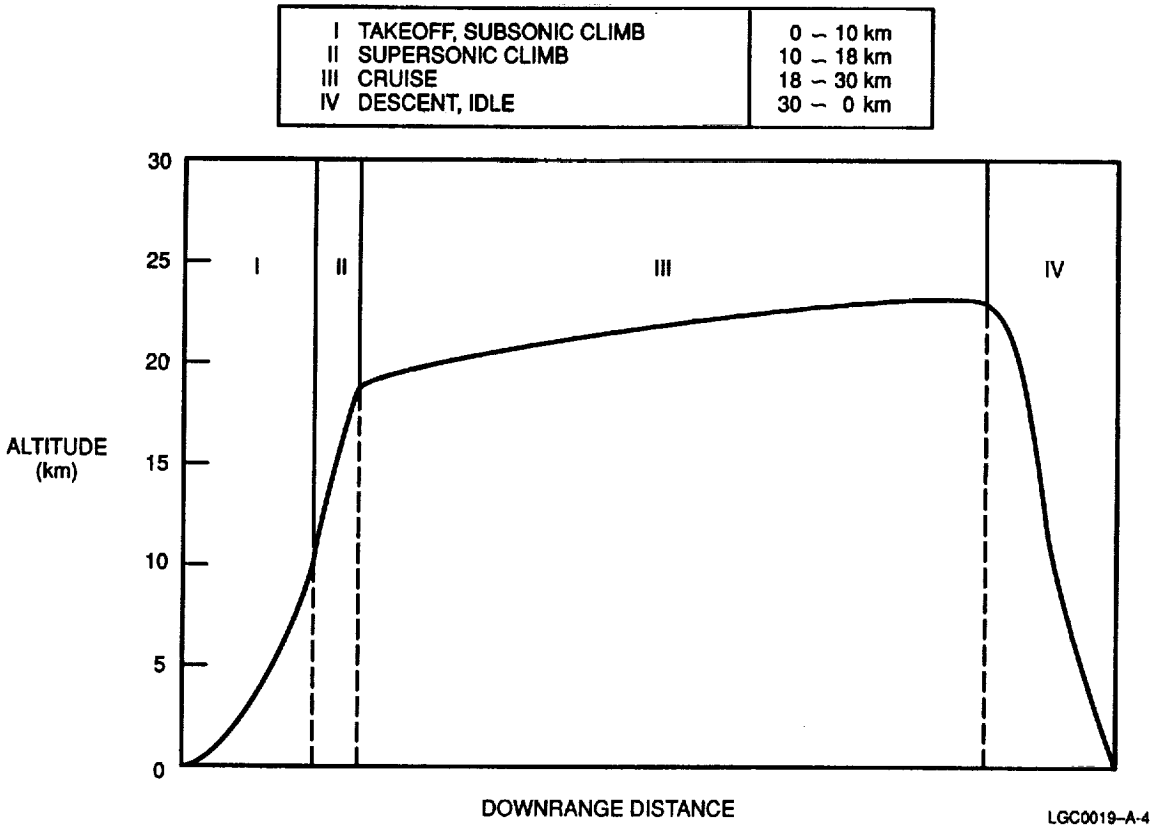

FIGURE 4. FOUR STAGES OF MISSION PROFILE CONSIDERED FOR ENGINE EMISSIONS

TABLE 2
FLIGHT PROFILE CHARACTERISTICS FOR A TYPICAL MACH 3.2 MISSION

ALTITUDE BAND	PERCENTAGE OF TIME SPENT		
	TAKEOFF AND CLIMB	CRUISE	DESCENT
0 – 10 km	59.5	—	40.5
10 – 18 km	49.8	—	50.2
18 – 30 km	1.1	94	4.9

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TABLE 3
EMISSION INDICES FOR P&W TBE ENGINES USED FOR ENGINE EMISSIONS STUDY
(LB/1,000 LB FUEL BURNED)

ALTITUDE BAND		$EINO_X$	EINO	$EINO_2$	EICO	$EICO_2$	EITHC	$EISO_2$	EIH_2O
0 – 10 km	MACH 1.6	4.8	4.1	0.7	0.8	3166.0	0.0	1.0	1233.0
	MACH 2.2	3.2	2.7	0.5	1.3	3165.5	0.1	1.0	1233.0
	MACH 3.2	2.7	2.3	0.4	13.6	3100.8	0.2	1.0	1350.0
10 – 18 km	MACH 1.6	5.2	4.4	0.7	1.1	3165.6	0.1	1.0	1233.0
	MACH 2.2	4.4	3.7	0.7	1.4	3165.3	0.1	1.0	1233.0
	MACH 3.2	4.7	3.9	0.7	2.2	3116.1	0.3	1.0	1350.0
18 – 30 km	MACH 1.6	5.2	4.4	0.8	1.1	3165.5	0.1	1.0	1233.0
	MACH 2.2	4.4	3.7	0.7	1.4	3165.1	0.1	1.0	1233.0
	MACH 3.2	4.9	4.1	0.8	1.9	3116.9	0.2	1.0	1350.0

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The number of molecules of a given constituent is calculated based on the total fuel burn in pounds, and the appropriate emission index. An example of this calculation for NO is shown below.

$$\text{NO molecules} = \text{fuel burn} \times \frac{2 \text{ lb NO}}{1{,}000 \text{ lb fuel burn}} \times \frac{0.4536 \text{ kg}}{\text{lb}} \times \frac{6.0251 \times 10^{23} \text{ molecules}}{\text{mole}} \times \frac{1 \text{ mole}}{30.01 \text{ kg}}$$

fuel burn in altitude, latitude grid cell	EINO	unit conversion	Avogadro's number	NO molecular weight

This calculation is performed on each altitude, latitude grid cell for each constituent to provide the final input for the global atmospheric models. The final prepared input is given in the Appendix for each of the baseline configurations. Summary results across the altitude and latitude bands are also provided.

SUMMARY

The emission input for global atmospheric chemistry models has been prepared for baseline HSCT configurations cruising at speeds of Mach 1.6, 2.2, and 3.2. The worldwide route structure is set by the 10 IATA regions selected as most favorable for HSCT operation based on traffic forecasts and route structures. Complete mission flight profiles were established for each region based on the city pairs chosen as representative for that region. The operational scenarios correspond to a year 2005 time frame with no restriction on overland supersonic operations, though the amount of overland flight for a given route was a factor in choosing the IATA regions for HSCT service.

The fare premium of supersonic flight over subsonic flight was set at zero in order to arrive at the most conservative fuel burn estimates possible, resulting in a 50 percent market capture for the HSCT in the 10 IATA regions. Load factors were set for each of the 10 regions in correspondence with observed airline trends.

Annual fuel burns were calculated in conjunction with the above-mentioned economic assumptions and aircraft performance characteristics. Individual constituent emissions were determined based on composite fuel burn data and engine company emission index values for NO_x, NO, NO_2, CO, CO_2, H_2O, CO_2, and THC (trace hydrocarbons).

APPENDIX

Page

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_X
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																	TOTAL
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.326E+31	.452E+31	.000E+00	.000E+00	.711E+31	.435E+31	.575E+30	.595E+33	.206E+32	.691E+31	.000E+00	.000E+00	.000E+00	.642E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.376E+31	.452E+31	.000E+00	.000E+00	.711E+31	.440E+31	.575E+30	.160E+32	.165E+32	.691E+31	.000E+00	.000E+00	.000E+00	.597E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.376E+31	.452E+31	.000E+00	.000E+00	.711E+31	.440E+31	.575E+30	.163E+32	.161E+32	.691E+31	.000E+00	.000E+00	.000E+00	.597E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.376E+31	.452E+31	.000E+00	.000E+00	.711E+31	.440E+31	.575E+30	.166E+32	.158E+32	.691E+31	.000E+00	.000E+00	.000E+00	.597E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.301E+31	.455E+31	.000E+00	.000E+00	.684E+31	.421E+31	.426E+30	.155E+32	.150E+32	.466E+31	.000E+00	.000E+00	.000E+00	.542E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.348E+31	.799E+31	.000E+00	.000E+00	.113E+32	.690E+31	.394E+30	.243E+32	.243E+32	.285E+31	.000E+00	.000E+00	.000E+00	.815E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.364E+31	.803E+31	.000E+00	.000E+00	.113E+32	.551E+31	.187E+31	.252E+32	.246E+32	.305E+31	.000E+00	.000E+00	.000E+00	.832E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.457E+31	.824E+31	.000E+00	.000E+00	.117E+32	.632E+30	.730E+31	.306E+32	.249E+32	.534E+31	.000E+00	.000E+00	.000E+00	.933E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.458E+31	.824E+31	.000E+00	.684E+31	.484E+31	.385E+30	.755E+31	.307E+32	.249E+32	.535E+31	.000E+00	.000E+00	.000E+00	.933E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.144E+32	.262E+32	.407E+32	.443E+32	.000E+00	.523E+30	.344E+32	.110E+33	.144E+33	.764E+31	.000E+00	.000E+00	.000E+00	.422E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.102E+32	.194E+32	.122E+33	.121E+33	.522E+32	.449E+32	.492E+32	.959E+32	.660E+33	.175E+33	.000E+00	.000E+00	.000E+00	.135E+34
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.435E+30	.946E+32	.000E+00	.000E+00	.833E+31	.119E+32	.281E+32	.474E+32	.209E+33	.218E+33	.000E+00	.000E+00	.000E+00	.618E+33
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.589E+32	.195E+33	.163E+33	.172E+33	.135E+33	.925E+32	.131E+33	.102E+34	.120E+34	.449E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .362E+34

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.300E+31	.416E+31	.000E+00	.000E+00	.653E+31	.400E+31	.529E+30	.547E+33	.190E+32	.635E+31	.000E+00	.000E+00	.000E+00	.590E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.346E+31	.416E+31	.000E+00	.000E+00	.653E+31	.404E+31	.529E+30	.147E+32	.152E+32	.635E+31	.000E+00	.000E+00	.000E+00	.549E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.346E+31	.416E+31	.000E+00	.000E+00	.653E+31	.404E+31	.529E+30	.150E+32	.148E+32	.635E+31	.000E+00	.000E+00	.000E+00	.549E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.346E+31	.416E+31	.000E+00	.000E+00	.653E+31	.404E+31	.529E+30	.153E+32	.145E+32	.635E+31	.000E+00	.000E+00	.000E+00	.549E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.277E+31	.419E+31	.000E+00	.000E+00	.629E+31	.387E+31	.392E+30	.142E+32	.138E+32	.429E+31	.000E+00	.000E+00	.000E+00	.499E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.312E+31	.716E+31	.000E+00	.000E+00	.101E+32	.618E+31	.353E+30	.218E+32	.218E+32	.255E+31	.000E+00	.000E+00	.000E+00	.730E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.326E+31	.719E+31	.000E+00	.000E+00	.102E+32	.494E+31	.168E-31	.226E+32	.220E+32	.273E+31	.000E+00	.000E+00	.000E+00	.746E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.410E+31	.738E+31	.000E+00	.000E+00	.105E+32	.567E+30	.654E+31	.274E+32	.223E+32	.478E+31	.000E+00	.000E+00	.000E+00	.836E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.410E+31	.738E+31	.000E+00	.613E+31	.433E+31	.345E+30	.676E+31	.275E+32	.223E+32	.479E+31	.000E+00	.000E+00	.000E+00	.836E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E-00	.000E+00	.130E+32	.237E+32	.367E+32	.400E+32	.000E-00	.473E+30	.310E+32	.996E+32	.130E+33	.690E+31	.000E+00	.000E+00	.000E+00	.381E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.920E+31	.175E+32	.111E+33	.109E+33	.472E+32	.406E+32	.444E+32	.866E+32	.596E+33	.158E+33	.000E+00	.000E+00	.000E+00	.122E+34
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.393E+30	.855E+32	.000E+00	.000E+00	.752E+31	.107E+32	.253E+32	.428E+32	.189E+33	.197E+33	.000E+00	.000E+00	.000E+00	.558E+33
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.533E+32	.177E+33	.147E+33	.155E+33	.122E+33	.838E+32	.119E+33	.934E+33	.108E+34	.406E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .328E+34

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	L	LATITUDE BAND (DEG.)																	TOTAL
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	
0.0 - 2.0	.300E+00	.000E+00	.000E+00	.000E+00	.000E+00	.340E+30	.471E+30	.000E+00	.000E+00	.741E+30	.453E+30	.600E+29	.620E+32	.215E+31	.721E+30	.000E+00	.000E+00	.000E+00	.670E+32
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.392E+30	.471E+30	.000E+00	.000E+00	.741E+30	.459E+30	.600E+29	.166E+31	.172E+31	.721E+30	.000E+00	.000E+00	.000E+00	.623E+31
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.392E+30	.471E+30	.000E+00	.000E+00	.741E+30	.459E+30	.600E+29	.170E+31	.168E+31	.721E+30	.000E+00	.000E+00	.000E+00	.623E+31
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.392E+30	.471E+30	.000E+00	.000E+00	.741E+30	.459E+30	.600E+29	.173E+31	.165E+31	.721E+30	.000E+00	.000E+00	.000E+00	.623E+31
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.314E+30	.475E+30	.000E+00	.000E+00	.714E+30	.439E+30	.445E+29	.162E+31	.157E+31	.487E+30	.000E+00	.000E+00	.000E+00	.566E+31
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.365E+30	.838E+30	.000E+00	.000E+00	.118E-31	.724E+30	.413E+29	.255E+31	.255E+31	.299E+30	.000E+00	.000E+00	.000E+00	.855E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.382E+30	.842E+30	.000E+00	.000E+00	.119E-31	.578E+30	.197E+30	.265E+31	.257E+31	.319E+30	.000E+00	.000E+00	.000E+00	.873E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.480E+30	.864E+30	.000E+00	.000E+00	.122E+31	.663E+29	.766E+30	.321E+31	.261E+31	.560E+30	.000E+00	.000E+00	.000E+00	.978E+31
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.480E+30	.864E+30	.000E+00	.717E+30	.507E+30	.404E+29	.792E+30	.322E+31	.261E+31	.561E+30	.000E+00	.000E+00	.000E+00	.979E+31
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.166E+31	.302E+31	.467E+31	.510E+31	.000E+00	.602E+29	.395E+31	.127E+32	.165E+32	.879E+30	.000E+00	.000E+00	.000E+00	.486E+32
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.117E+31	.223E+31	.141E+32	.139E+32	.601E+31	.517E+31	.566E+31	.110E+32	.759E+32	.201E+32	.000E+00	.000E+00	.000E+00	.155E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.501E+29	.109E+32	.000E+00	.000E+00	.958E+30	.136E+31	.323E+31	.545E+31	.241E+32	.251E+32	.000E+00	.000E+00	.000E+00	.711E+32
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E-30	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.642E+31	.219E+32	.187E+32	.197E+32	.147E+32	.103E+32	.149E+32	.110E+33	.136E+33	.512E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .403E+33

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.190E+32	.263E+32	.000E+00	.000E+00	.414E+32	.253E+32	.335E+31	.347E+34	.120E+33	.402E+32	.000E+00	.000E+00	.000E+00	.374E+34
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.219E+32	.263E+32	.000E+00	.000E+00	.414E+32	.256E+32	.335E+31	.930E+32	.960E+32	.402E+32	.000E+00	.000E+00	.000E+00	.348E+33
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.219E+32	.263E+32	.000E+00	.000E+00	.414E+32	.256E+32	.335E+31	.951E+32	.939E+32	.402E+32	.000E+00	.000E+00	.000E+00	.348E+33
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.219E+32	.263E+32	.000E+00	.000E+00	.414E+32	.256E+32	.335E+31	.969E+32	.921E+32	.402E+32	.000E+00	.000E+00	.000E+00	.348E+33
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.175E+32	.265E+32	.000E+00	.000E+00	.399E+32	.245E+32	.248E+31	.903E+32	.876E+32	.272E+32	.000E+00	.000E+00	.000E+00	.316E+33
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.189E+31	.433E+31	.000E+00	.000E+00	.611E+31	.374E+31	.213E+30	.132E+32	.132E+32	.154E+31	.000E+00	.000E+00	.000E+00	.441E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.197E+31	.435E+31	.000E+00	.000E+00	.614E+31	.299E+31	.101E+31	.137E+32	.133E+32	.165E+31	.000E+00	.000E+00	.000E+00	.451E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.248E+31	.446E+31	.000E+00	.000E+00	.632E+31	.342E+30	.395E+31	.166E+32	.135E+32	.289E+31	.000E+00	.000E+00	.000E+00	.505E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.248E+31	.446E+31	.000E+00	.370E+31	.262E+31	.208E+30	.409E+31	.166E+32	.135E+32	.290E+31	.000E+00	.000E+00	.000E+00	.505E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.646E+31	.118E+32	.182E+32	.199E+32	.000E+00	.235E+30	.154E+32	.495E+32	.645E+32	.343E+31	.000E+00	.000E+00	.000E+00	.189E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.457E+31	.868E+31	.549E+32	.541E+32	.234E+32	.202E+32	.221E+32	.430E+32	.296E+33	.784E+32	.000E+00	.000E+00	.000E+00	.605E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.195E+30	.424E+32	.000E+00	.000E+00	.374E+31	.532E+31	.126E+32	.213E+32	.939E+32	.978E+32	.000E+00	.000E+00	.000E+00	.277E+33
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.122E+33	.212E+33	.731E+32	.777E+32	.254E+33	.160E+33	.752E+32	.401E+34	.998E+33	.377E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .636E+34

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : THC
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																	
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.441E+29	.612E+29	.000E+00	.000E+00	.962E+29	.588E+29	.778E+28	.805E+31	.279E+30	.935E+29	.000E+00	.000E+00	.000E+00	.869E+31
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.509E+29	.612E+29	.000E+00	.000E+00	.962E+29	.595E+29	.778E+28	.216E+30	.223E+30	.935E+29	.000E+00	.000E+00	.000E+00	.808E+30
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.509E+29	.612E+29	.000E+00	.000E+00	.962E+29	.595E+29	.778E+28	.221E+30	.218E+30	.935E+29	.000E+00	.000E+00	.000E+00	.808E+30
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.509E+29	.612E+29	.000E+00	.000E+00	.962E+29	.595E+29	.778E+28	.225E+30	.214E+30	.935E+29	.000E+00	.000E+00	.000E+00	.808E+30
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.407E+29	.616E+29	.000E+00	.000E+00	.926E+29	.570E+29	.577E+28	.210E+30	.203E+30	.631E+29	.000E+00	.000E+00	.000E+00	.734E+30
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.406E+29	.932E+29	.000E+00	.000E+00	.132E+30	.805E+29	.460E+28	.283E+30	.283E+30	.332E+29	.000E+00	.000E+00	.000E+00	.950E+30
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.425E+29	.936E+29	.000E+00	.000E+00	.132E+30	.643E+29	.219E+29	.294E+30	.286E+30	.355E+29	.000E+00	.000E+00	.000E+00	.971E+30
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.533E+29	.961E+29	.000E+00	.000E+00	.136E+30	.738E+28	.851E+29	.357E+30	.290E+30	.622E+29	.000E+00	.000E+00	.000E+00	.109E+31
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.534E+29	.961E+29	.000E+00	.798E+29	.564E+29	.449E+28	.881E+29	.358E+30	.290E+30	.624E+29	.000E+00	.000E+00	.000E+00	.109E+31
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.107E+30	.196E+30	.303E+30	.331E+30	.000E+00	.390E+28	.256E+30	.822E+30	.107E+31	.570E+29	.000E+00	.000E+00	.000E+00	.315E+31
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.760E+29	.144E+30	.913E+30	.899E+30	.390E+30	.335E+30	.367E+30	.715E+30	.492E+31	.130E+31	.000E+00	.000E+00	.000E+00	.101E+32
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.325E+28	.706E+30	.000E+00	.000E+00	.621E+29	.884E+29	.209E+30	.353E+30	.156E+31	.163E+31	.000E+00	.000E+00	.000E+00	.461E+31
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.614E+30	.173E+31	.122E+31	.131E+31	.139E+31	.878E+30	.107E+31	.121E+32	.984E+31	.362E+31	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .338E+32

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.276E+34	.382E+34	.000E+00	.000E+00	.601E+34	.367E+34	.486E+33	.503E+36	.174E+35	.584E+34	.000E+00	.000E+00	.000E+00	.543E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.318E+34	.382E+34	.000E+00	.000E+00	.601E+34	.372E+34	.486E+33	.135E+35	.139E+35	.584E+34	.000E+00	.000E+00	.000E+00	.505E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.318E+34	.382E+34	.000E+00	.000E+00	.601E+34	.372E+34	.486E+33	.138E+35	.136E+35	.584E+34	.000E+00	.000E+00	.000E+00	.505E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.318E+34	.382E+34	.000E+00	.000E+00	.601E+34	.372E+34	.486E+33	.141E+35	.134E+35	.584E+34	.000E+00	.000E+00	.000E+00	.505E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.254E+34	.385E+34	.000E+00	.000E+00	.578E+34	.356E+34	.360E+33	.131E+35	.127E+35	.394E+34	.000E+00	.000E+00	.000E+00	.458E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.170E+34	.390E+34	.000E+00	.000E+00	.551E+34	.337E+34	.192E+33	.119E+35	.119E+35	.139E+34	.000E+00	.000E+00	.000E+00	.398E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.178E+34	.392E+34	.000E+00	.000E+00	.554E+34	.269E+34	.915E+33	.123E+35	.120E+35	.149E+34	.000E+00	.000E+00	.000E+00	.406E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.223E+34	.402E+34	.000E+00	.000E+00	.570E+34	.309E+33	.356E+34	.150E+35	.121E+35	.260E+34	.000E+00	.000E+00	.000E+00	.455E+35
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.224E+34	.402E+34	.000E+00	.334E+34	.236E+34	.188E+33	.369E+34	.150E+35	.121E+35	.261E+34	.000E+00	.000E+00	.000E+00	.456E+35
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.675E+34	.123E+35	.190E+35	.208E+35	.000E+00	.245E+33	.161E+35	.516E+35	.674E+35	.358E+34	.000E+00	.000E+00	.000E+00	.198E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.477E+34	.907E+34	.573E+35	.565E+35	.245E+35	.210E+35	.230E+35	.449E+35	.309E+36	.818E+35	.000E+00	.000E+00	.000E+00	.632E+36
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.204E+33	.443E+35	.000E+00	.000E+00	.390E+34	.555E+34	.131E+35	.222E+35	.980E+35	.102E+36	.000E+00	.000E+00	.000E+00	.289E+36
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.345E+35	.101E+36	.764E+35	.806E+35	.773E+35	.518E+35	.629E+35	.730E+36	.594E+36	.223E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .203E+37

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : H_2O
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.293E+34	.406E+34	.000E+00	.000E+00	.639E+34	.391E+34	.517E+33	.535E+36	.185E+35	.621E+34	.000E+00	.000E+00	.000E+00	.577E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.338E+34	.406E+34	.000E+00	.000E+00	.639E+34	.395E+34	.517E+33	.143E+35	.148E+35	.621E+34	.000E+00	.000E+00	.000E+00	.537E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.338E+34	.406E+34	.000E+00	.000E+00	.639E+34	.395E+34	.517E+33	.147E+35	.145E+35	.621E+34	.000E+00	.000E+00	.000E+00	.537E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.338E+34	.406E+34	.000E+00	.000E+00	.639E+34	.395E+34	.517E+33	.150E+35	.142E+35	.621E+34	.000E+00	.000E+00	.000E+00	.537E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.270E+34	.409E+34	.000E+00	.000E+00	.615E+34	.379E+34	.383E+33	.139E+35	.135E+35	.419E+34	.000E+00	.000E+00	.000E+00	.488E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.180E+34	.413E+34	.000E+00	.000E+00	.583E+34	.356E+34	.204E+33	.125E+35	.126E+35	.147E+34	.000E+00	.000E+00	.000E+00	.421E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.188E+34	.415E+34	.000E+00	.000E+00	.586E+34	.285E+34	.968E+33	.130E+35	.127E+35	.157E+34	.000E+00	.000E+00	.000E+00	.430E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.236E+34	.425E+34	.000E+00	.000E+00	.603E+34	.327E+33	.377E+34	.158E+35	.129E+35	.276E+34	.000E+00	.000E+00	.000E+00	.482E+35
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.237E+34	.425E+34	.000E+00	.353E+34	.250E+34	.199E+33	.390E+34	.158E+35	.128E+35	.276E+34	.000E+00	.000E+00	.000E+00	.482E+35
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.714E+34	.130E+35	.201E+35	.220E+35	.000E+00	.259E+33	.170E+35	.546E+35	.712E+35	.379E+34	.000E+00	.000E+00	.000E+00	.209E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.505E+34	.959E+34	.606E+35	.597E+35	.259E+35	.223E+35	.244E+35	.475E+35	.327E+36	.866E+35	.000E+00	.000E+00	.000E+00	.669E+36
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.216E+33	.469E+35	.000E+00	.000E+00	.413E+34	.587E+34	.139E+35	.235E+35	.104E+36	.108E+36	.000E+00	.000E+00	.000E+00	.306E+36
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.366E+35	.107E+36	.808E+35	.852E+35	.819E+35	.549E+35	.666E+35	.775E+36	.629E+36	.236E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .215E+37

MACH 3.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : SO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																		
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.610E+30	.846E+30	.000E+00	.000E+00	.133E+31	.814E+30	.108E+30	.111E+33	.386E+31	.129E+31	.000E+00	.000E+00	.000E+00	.120E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.704E+30	.846E+30	.000E+00	.000E+00	.133E+31	.823E+30	.108E+30	.299E+31	.309E+31	.129E+31	.000E+00	.000E+00	.000E+00	.112E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.704E+30	.846E+30	.000E+00	.000E+00	.133E+31	.823E+30	.108E+30	.306E+31	.302E+31	.129E+31	.000E+00	.000E+00	.000E+00	.112E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.704E+30	.846E+30	.000E+00	.000E+00	.133E+31	.823E+30	.108E+30	.311E+31	.296E+31	.129E+31	.000E+00	.000E+00	.000E+00	.112E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.563E+30	.852E+30	.000E+00	.000E+00	.128E+31	.789E+30	.798E+29	.290E+31	.282E+31	.874E+30	.000E+00	.000E+00	.000E+00	.102E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.375E+30	.860E+30	.000E+00	.000E+00	.122E+31	.742E+30	.424E+29	.261E+31	.262E+31	.306E+30	.000E+00	.000E+00	.000E+00	.877E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.392E+30	.864E+30	.000E+00	.000E+00	.122E+31	.593E+30	.202E+30	.271E+31	.264E+31	.328E+30	.000E+00	.000E+00	.000E+00	.895E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.492E+30	.886E+30	.000E+00	.000E+00	.126E+31	.680E+29	.786E+30	.330E+31	.268E+31	.574E+30	.000E+00	.000E+00	.000E+00	.100E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.493E+30	.886E+30	.000E+00	.736E+30	.521E+30	.414E+29	.812E+30	.330E+31	.268E+31	.576E+30	.000E+00	.000E+00	.000E+00	.100E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.149E+31	.271E+31	.420E+31	.457E+31	.000E+00	.540E+29	.355E+31	.114E+32	.148E+32	.789E+30	.000E+00	.000E+00	.000E+00	.436E+32
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.105E+31	.200E+31	.126E+32	.124E+32	.539E+31	.464E+31	.508E+31	.989E+31	.681E+32	.180E+32	.000E+00	.000E+00	.000E+00	.139E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.449E+29	.976E+31	.000E+00	.000E+00	.860E+30	.122E+31	.290E+31	.489E+31	.216E+32	.225E+32	.000E+00	.000E+00	.000E+00	.638E+32
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.762E+31	.222E+32	.168E+32	.178E+32	.171E+32	.114E+32	.139E+32	.162E+33	.131E+33	.492E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .448E+33

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_X
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.331E+31	.457E+31	.000E+00	.000E+00	.721E+31	.424E+31	.566E+30	.662E+33	.206E+32	.141E+32	.000E+00	.000E+00	.000E+00	.717E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.377E+31	.457E+31	.000E+00	.000E+00	.721E+31	.429E+31	.566E+30	.164E+32	.162E+32	.141E+32	.000E+00	.000E+00	.000E+00	.671E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.377E+31	.457E+31	.000E+00	.000E+00	.721E+31	.429E+31	.566E+30	.169E+32	.158E+32	.141E+32	.000E+00	.000E+00	.000E+00	.671E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.377E+31	.457E+31	.000E+00	.000E+00	.721E+31	.429E+31	.566E+30	.171E+32	.156E+32	.141E+32	.000E+00	.000E+00	.000E+00	.671E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.299E+31	.507E+31	.000E+00	.000E+00	.758E+31	.450E+31	.402E+30	.169E+32	.161E+32	.837E+31	.000E+00	.000E+00	.000E+00	.619E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.268E+31	.789E+31	.000E+00	.000E+00	.111E+32	.604E+31	.779E+30	.230E+32	.231E+32	.911E+30	.000E+00	.000E+00	.000E+00	.755E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.250E+31	.732E+31	.000E+00	.000E+00	.103E+32	.466E+30	.587E+31	.214E+32	.213E+32	.860E+30	.000E+00	.000E+00	.000E+00	.700E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.146E+31	.408E+31	.000E+00	.000E+00	.531E+31	.662E+29	.343E+31	.122E+32	.109E+32	.766E+30	.000E+00	.000E+00	.000E+00	.382E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.319E+31	.137E+32	.157E+32	.587E+31	.177E+31	.582E+29	.894E+31	.644E+32	.501E+32	.765E+30	.000E+00	.000E+00	.000E+00	.164E+33
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.209E+31	.439E+32	.115E+33	.133E+33	.470E+32	.349E+32	.602E+32	.109E+33	.652E+33	.123E+33	.000E+00	.000E+00	.000E+00	.132E+34
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.252E+32	.662E+32	.906E+31	.882E+30	.531E+31	.162E+32	.274E+32	.757E+32	.169E+33	.231E+33	.000E+00	.000E+00	.000E+00	.626E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.547E+32	.166E+33	.140E+33	.140E+33	.117E+33	.793E+32	.109E+33	.104E+34	.101E+34	.423E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .327E+34

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.301E+31	.416E+31	.000E+00	.000E+00	.657E+31	.387E+31	.516E+30	.603E+33	.188E+32	.128E+32	.000E+00	.000E+00	.000E+00	.653E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.343E+31	.416E+31	.000E+00	.000E+00	.657E+31	.391E+31	.516E+30	.149E+32	.148E+32	.128E+32	.000E+00	.000E+00	.000E+00	.612E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.343E+31	.416E+31	.000E+00	.000E+00	.657E+31	.391E+31	.516E+30	.154E+32	.144E+32	.128E+32	.000E+00	.000E+00	.000E+00	.612E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.343E+31	.416E+31	.000E+00	.000E+00	.657E+31	.391E+31	.516E+30	.155E+32	.142E+32	.128E+32	.000E+00	.000E+00	.000E+00	.612E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.272E+31	.462E+31	.000E+00	.000E+00	.691E+31	.410E+31	.366E+30	.154E+32	.146E+32	.763E+31	.000E+00	.000E+00	.000E+00	.564E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.243E+31	.716E+31	.000E+00	.000E+00	.101E+32	.549E+31	.707E+30	.209E+32	.210E+32	.827E+30	.000E+00	.000E+00	.000E+00	.685E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.227E+31	.665E+31	.000E+00	.000E+00	.931E+31	.423E+30	.533E+31	.194E+32	.194E+32	.780E+30	.000E+00	.000E+00	.000E+00	.636E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.132E+31	.370E+31	.000E+00	.000E+00	.482E+31	.601E+29	.312E+31	.111E+32	.990E+31	.695E+30	.000E+00	.000E+00	.000E+00	.347E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.290E+31	.124E+32	.142E+32	.533E+31	.161E+31	.528E+29	.812E+31	.584E+32	.455E+32	.695E+30	.000E+00	.000E+00	.000E+00	.149E+33
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.190E+31	.398E+32	.105E+33	.121E+33	.427E+32	.317E+32	.547E+32	.989E+32	.592E+33	.112E+33	.000E+00	.000E+00	.000E+00	.120E+34
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.229E+32	.601E+32	.823E+31	.801E+30	.482E+31	.147E+32	.249E+32	.687E+32	.153E+33	.210E+33	.000E+00	.000E+00	.000E+00	.568E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.497E+32	.151E+33	.127E+33	.127E+33	.106E+33	.721E+32	.992E+32	.942E+33	.918E+33	.384E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .298E+34

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																		
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.364E+30	.503E+30	.000E+00	.000E+00	.793E+30	.467E+30	.623E+29	.729E+32	.227E+31	.155E+31	.000E+00	.000E+00	.000E+00	.789E+32
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.415E+30	.503E+30	.000E+00	.000E+00	.793E+30	.472E+30	.623E+29	.180E+31	.179E+31	.155E+31	.000E+00	.000E+00	.000E+00	.739E+31
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.415E+30	.503E+30	.000E+00	.000E+00	.793E+30	.472E+30	.623E+29	.186E+31	.173E+31	.155E+31	.000E+00	.000E+00	.000E+00	.739E+31
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.415E+30	.503E+30	.000E+00	.000E+00	.793E+30	.472E+30	.623E+29	.188E+31	.171E+31	.155E+31	.000E+00	.000E+00	.000E+00	.739E+31
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.329E+30	.558E+30	.000E+00	.000E+00	.834E+30	.495E+30	.442E+29	.186E+31	.177E+31	.921E+30	.000E+00	.000E+00	.000E+00	.681E+31
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.300E+30	.883E+30	.000E+00	.000E+00	.124E+31	.677E+30	.873E+29	.258E+31	.259E+31	.102E+30	.000E+00	.000E+00	.000E+00	.846E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.280E+30	.821E+30	.000E+00	.000E+00	.115E+31	.522E+29	.657E+30	.240E+31	.239E+31	.963E+29	.000E+00	.000E+00	.000E+00	.784E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.163E+30	.457E+30	.000E+00	.000E+00	.595E+30	.742E+28	.385E+30	.137E+31	.122E+31	.858E+29	.000E+00	.000E+00	.000E+00	.428E+31
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.358E+30	.153E+31	.176E+31	.658E+30	.198E+30	.652E+28	.100E+31	.721E+31	.561E+31	.857E+29	.000E+00	.000E+00	.000E+00	.184E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.235E+30	.491E+31	.129E+32	.149E+32	.527E+31	.391E+31	.674E+31	.122E+32	.730E+32	.138E+32	.000E+00	.000E+00	.000E+00	.148E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.282E+31	.742E+31	.102E+31	.988E+29	.595E+30	.181E+31	.307E+31	.848E+31	.189E+32	.259E+32	.000E+00	.000E+00	.000E+00	.701E+32
22.0 - 24.0	.000E+00	.000E-00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E-00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.609E+31	.186E+32	.157E+32	.156E+32	.131E+32	.884E+31	.122E+32	.115E+33	.113E+33	.472E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .365E+33

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.155E+31	.215E+31	.000E+00	.000E+00	.339E+31	.199E+31	.266E+30	.311E+33	.970E+31	.663E+31	.000E+00	.000E+00	.000E+00	.337E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.177E+31	.215E+31	.000E+00	.000E+00	.339E+31	.202E+31	.266E+30	.770E+31	.763E+31	.663E+31	.000E+00	.000E+00	.000E+00	.315E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.177E+31	.215E+31	.000E+00	.000E+00	.339E+31	.202E+31	.266E+30	.793E+31	.740E+31	.663E+31	.000E+00	.000E+00	.000E+00	.315E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.177E+31	.215E+31	.000E+00	.000E+00	.339E+31	.202E+31	.266E+30	.802E+31	.731E+31	.663E+31	.000E+00	.000E+00	.000E+00	.315E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.141E+31	.238E+31	.000E+00	.000E+00	.356E+31	.211E+31	.189E+30	.795E+31	.756E+31	.394E+31	.000E+00	.000E+00	.000E+00	.291E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.986E+30	.290E+31	.000E+00	.000E+00	.409E+31	.222E+31	.287E+30	.846E+31	.851E+31	.335E+30	.000E+00	.000E+00	.000E+00	.278E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.920E+30	.270E+31	.000E+00	.000E+00	.377E+31	.171E+30	.216E+31	.788E+31	.785E+31	.316E+30	.000E+00	.000E+00	.000E+00	.258E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.537E+30	.150E+31	.000E+00	.000E+00	.196E+31	.244E+29	.126E+31	.449E+31	.401E+31	.282E+30	.000E+00	.000E+00	.000E+00	.141E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.118E+31	.503E+31	.577E+31	.216E+31	.651E+30	.214E+29	.329E+31	.237E+32	.184E+32	.282E+30	.000E+00	.000E+00	.000E+00	.605E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.771E+30	.161E+32	.425E+32	.489E+32	.173E+32	.128E+32	.222E+32	.401E+32	.240E+33	.453E+32	.000E+00	.000E+00	.000E+00	.486E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.927E+31	.244E+32	.334E+31	.325E+30	.195E+31	.595E+31	.101E+32	.279E+32	.621E+32	.852E+32	.000E+00	.000E+00	.000E+00	.230E+33
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.219E+32	.636E+32	.516E+32	.514E+32	.468E+32	.314E+32	.405E+32	.455E+33	.380E+33	.162E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .131E+34

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : THC
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.189E+29	.261E+29	.000E+00	.000E+00	.411E+29	.242E+29	.323E+28	.378E+31	.118E+30	.805E+29	.000E+00	.000E+00	.000E+00	.409E+31
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.215E+29	.261E+29	.000E+00	.000E+00	.411E+29	.245E+29	.323E+28	.936E+29	.927E+29	.805E+29	.000E+00	.000E+00	.000E+00	.383E+30
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.215E+29	.261E+29	.000E+00	.000E+00	.411E+29	.245E+29	.323E+28	.963E+29	.900E+29	.805E+29	.000E+00	.000E+00	.000E+00	.383E+30
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.215E+29	.261E+29	.000E+00	.000E+00	.411E+29	.245E+29	.323E+28	.974E+29	.888E+29	.805E+29	.000E+00	.000E+00	.000E+00	.383E+30
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.171E+29	.289E+29	.000E+00	.000E+00	.433E+29	.257E+29	.229E+28	.966E+29	.918E+29	.478E+29	.000E+00	.000E+00	.000E+00	.354E+30
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.111E+29	.327E+29	.000E+00	.000E+00	.461E+29	.251E+29	.323E+28	.954E+29	.960E+29	.378E+28	.000E+00	.000E+00	.000E+00	.313E+30
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.104E+29	.304E+29	.000E+00	.000E+00	.426E+29	.193E+28	.244E+29	.889E+29	.886E+29	.357E+28	.000E+00	.000E+00	.000E+00	.291E+30
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.606E+28	.169E+29	.000E+00	.000E+00	.221E+29	.275E+27	.143E+29	.506E+29	.453E+29	.318E+28	.000E+00	.000E+00	.000E+00	.159E+30
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.133E+29	.568E+29	.651E+29	.244E+29	.735E+28	.242E+27	.371E+29	.267E+30	.208E+30	.318E+28	.000E+00	.000E+00	.000E+00	.683E+30
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.870E+28	.182E+30	.479E+30	.552E+30	.195E+30	.145E+30	.250E+30	.452E+30	.271E+31	.511E+30	.000E+00	.000E+00	.000E+00	.548E+31
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.105E+30	.275E+30	.376E+29	.366E+28	.220E+29	.672E+29	.114E+30	.314E+30	.700E+30	.961E+30	.000E+00	.000E+00	.000E+00	.260E+31
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.255E+30	.727E+30	.582E+30	.580E+30	.543E+30	.363E+30	.458E+30	.543E+31	.433E+31	.186E+31	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .151E+32

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.241E+34	.333E+34	.000E+00	.000E+00	.525E+34	.309E+34	.412E+33	.482E+36	.150E+35	.103E+35	.000E+00	.000E+00	.000E+00	.522E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.274E+34	.333E+34	.000E+00	.000E+00	.525E+34	.312E+34	.412E+33	.119E+35	.118E+35	.103E+35	.000E+00	.000E+00	.000E+00	.489E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.274E+34	.333E+34	.000E+00	.000E+00	.525E+34	.312E+34	.412E+33	.123E+35	.115E+35	.103E+35	.000E+00	.000E+00	.000E+00	.489E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.274E+34	.333E+34	.000E+00	.000E+00	.525E+34	.312E+34	.412E+33	.124E+35	.113E+35	.103E+35	.000E+00	.000E+00	.000E+00	.489E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.218E+34	.369E+34	.000E+00	.000E+00	.552E+34	.328E+34	.293E+33	.123E+35	.117E+35	.610E+34	.000E+00	.000E+00	.000E+00	.451E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.142E+34	.418E+34	.000E+00	.000E+00	.588E+34	.320E+34	.412E+33	.122E+35	.122E+35	.483E+33	.000E+00	.000E+00	.000E+00	.400E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.132E+34	.388E+34	.000E+00	.000E+00	.543E+34	.247E+33	.311E+34	.113E+35	.113E+35	.455E+33	.000E+00	.000E+00	.000E+00	.371E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.772E+33	.216E+34	.000E+00	.000E+00	.281E+34	.351E+32	.182E+34	.646E+34	.577E+34	.406E+33	.000E+00	.000E+00	.000E+00	.202E+35
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.169E+34	.724E+34	.830E+34	.311E+34	.937E+33	.308E+32	.474E+34	.341E+35	.265E+35	.405E+33	.000E+00	.000E+00	.000E+00	.871E+35
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.111E+34	.232E+35	.611E+35	.704E+35	.249E+35	.185E+35	.319E+35	.577E+35	.345E+36	.652E+35	.000E+00	.000E+00	.000E+00	.699E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.133E+35	.351E+35	.480E+34	.467E+33	.281E+34	.857E+34	.145E+35	.401E+35	.893E+35	.123E+36	.000E+00	.000E+00	.000E+00	.332E+36
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.325E+35	.928E+35	.742E+35	.739E+35	.693E+35	.463E+35	.584E+35	.693E+36	.552E+36	.237E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .193E+37

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : H_2O
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																		
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.229E+34	.317E+34	.000E+00	.000E+00	.499E+34	.294E+34	.392E+33	.459E+36	.143E+35	.977E+34	.000E+00	.000E+00	.000E+00	.497E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.261E+34	.317E+34	.000E+00	.000E+00	.499E+34	.297E+34	.392E+33	.114E+35	.112E+35	.977E+34	.000E+00	.000E+00	.000E+00	.465E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.261E+34	.317E+34	.000E+00	.000E+00	.499E+34	.297E+34	.392E+33	.117E+35	.109E+35	.977E+34	.000E+00	.000E+00	.000E+00	.465E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.261E+34	.317E+34	.000E+00	.000E+00	.499E+34	.297E+34	.392E+33	.118E+35	.108E+35	.977E+34	.000E+00	.000E+00	.000E+00	.465E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.207E+34	.351E+34	.000E+00	.000E+00	.525E+34	.312E+34	.278E+33	.117E+35	.111E+35	.580E+34	.000E+00	.000E+00	.000E+00	.429E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.135E+34	.397E+34	.000E+00	.000E+00	.560E+34	.305E+34	.392E+33	.116E+35	.116E+35	.459E+33	.000E+00	.000E+00	.000E+00	.380E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.126E+34	.369E+34	.000E+00	.000E+00	.517E+34	.235E+33	.296E+34	.108E+35	.108E+35	.433E+33	.000E+00	.000E+00	.000E+00	.353E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.735E+33	.205E+34	.000E+00	.000E+00	.268E+34	.334E+32	.173E+34	.614E+34	.549E+34	.386E+33	.000E+00	.000E+00	.000E+00	.192E+35
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.161E+34	.689E+34	.789E+34	.296E+34	.891E+33	.293E+32	.451E+34	.324E+35	.252E+35	.386E+33	.000E+00	.000E+00	.000E+00	.828E+35
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.106E+34	.221E+35	.582E+35	.670E+35	.237E+35	.176E+35	.303E+35	.549E+35	.328E+36	.620E+35	.000E+00	.000E+00	.000E+00	.665E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.127E+35	.334E+35	.457E+34	.444E+33	.267E+34	.815E+34	.138E+35	.382E+35	.850E+35	.117E+36	.000E+00	.000E+00	.000E+00	.315E+36
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.309E+35	.882E+35	.706E+35	.704E+35	.659E+35	.441E+35	.556E+35	.659E+36	.525E+36	.225E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .184E+37

MACH 2.2 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : SO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

	LATITUDE BAND (DEG.)																		
ALTITUDE RANGE (KM.)	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.522E+30	.722E+30	.000E+00	.000E+00	.114E+31	.671E+30	.894E+29	.105E+33	.326E+31	.223E+31	.000E+00	.000E+00	.000E+00	.113E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.595E+30	.722E+30	.000E+00	.000E+00	.114E+31	.678E+30	.894E+29	.259E+31	.257E+31	.223E+31	.000E+00	.000E+00	.000E+00	.106E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.595E+30	.722E+30	.000E+00	.000E+00	.114E+31	.678E+30	.894E+29	.267E+31	.249E+31	.223E+31	.000E+00	.000E+00	.000E+00	.106E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.595E+30	.722E+30	.000E+00	.000E+00	.114E+31	.678E+30	.894E+29	.270E+31	.246E+31	.223E+31	.000E+00	.000E+00	.000E+00	.106E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.473E+30	.801E+30	.000E+00	.000E+00	.120E+31	.711E+30	.635E+29	.267E+31	.254E+31	.132E+31	.000E+00	.000E+00	.000E+00	.979E+31
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.308E+30	.906E+30	.000E+00	.000E+00	.128E+31	.695E+30	.895E+29	.264E+31	.266E+31	.105E+30	.000E+00	.000E+00	.000E+00	.868E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.287E+30	.842E+30	.000E+00	.000E+00	.118E+31	.535E+29	.674E+30	.246E+31	.245E+31	.988E+29	.000E+00	.000E+00	.000E+00	.805E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.168E+30	.468E+30	.000E+00	.000E+00	.611E+30	.761E+28	.395E+30	.140E+31	.125E+31	.880E+29	.000E+00	.000E+00	.000E+00	.439E+31
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.367E+30	.157E+31	.180E+31	.675E+30	.203E+30	.669E+28	.103E+31	.740E+31	.576E+31	.880E+29	.000E+00	.000E+00	.000E+00	.189E+32
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.241E+30	.504E+31	.133E+32	.153E+32	.540E+31	.401E+31	.692E+31	.125E+32	.749E+32	.141E+32	.000E+00	.000E+00	.000E+00	.152E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.289E+31	.761E+31	.104E+31	.101E+30	.610E+30	.186E+31	.315E+31	.870E+31	.194E+32	.266E+32	.000E+00	.000E+00	.000E+00	.720E+32
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.705E+31	.201E+32	.161E+32	.160E+32	.150E+32	.100E+32	.127E+32	.150E+33	.120E+33	.514E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .419E+33

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_X
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																	TOTAL
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.418E+31	.629E+31	.000E+00	.000E+00	.987E+31	.612E+31	.705E+30	.993E+33	.297E+32	.821E+31	.000E+00	.000E+00	.000E+00	.106E+34
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.471E+31	.629E+31	.000E+00	.000E+00	.987E+31	.617E+31	.705E+30	.219E+32	.233E+32	.820E+31	.000E+00	.000E+00	.000E+00	.811E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.471E+31	.629E+31	.000E+00	.000E+00	.987E+31	.617E+31	.705E+30	.225E+32	.227E+32	.821E+31	.000E+00	.000E+00	.000E+00	.811E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.471E+31	.629E+31	.000E+00	.000E+00	.987E+31	.617E+31	.705E+30	.227E+32	.225E+32	.820E+31	.000E+00	.000E+00	.000E+00	.811E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.374E+31	.642E+31	.000E+00	.000E+00	.964E+31	.604E+31	.504E+30	.215E+32	.216E+32	.512E+31	.000E+00	.000E+00	.000E+00	.745E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.265E+31	.715E+31	.000E+00	.000E+00	.101E+32	.634E+31	.254E+30	.214E+32	.222E+32	.101E+31	.000E+00	.000E+00	.000E+00	.711E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.247E+31	.756E+31	.000E+00	.000E+00	.941E+31	.245E+31	.368E+31	.198E+32	.207E+32	.865E+30	.000E+00	.000E+00	.000E+00	.670E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.654E+31	.267E+32	.280E+32	.101E+32	.579E+31	.321E+29	.146E+32	.119E+33	.818E+32	.287E+30	.000E+00	.000E+00	.000E+00	.293E+33
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.159E+30	.465E+32	.131E+33	.154E+33	.565E+32	.408E+32	.718E+32	.984E+32	.791E+33	.152E+33	.000E+00	.000E+00	.000E+00	.154E+34
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.357E+32	.830E+32	.100E+32	.000E+00	.842E+31	.214E+32	.347E+32	.104E+33	.214E+33	.318E+33	.000E+00	.000E+00	.000E+00	.829E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.696E+32	.203E+33	.169E+33	.164E+33	.139E+33	.102E+33	.128E+33	.144E+34	.125E+34	.510E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .418E+34

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.385E+31	.580E+31	.000E+00	.000E+00	.910E+31	.564E+31	.651E+30	.916E+33	.274E+32	.757E+31	.000E+00	.000E+00	.000E+00	.976E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.434E+31	.580E+31	.000E+00	.000E+00	.910E+31	.569E+31	.650E+30	.202E+32	.215E+32	.757E+31	.000E+00	.000E+00	.000E+00	.748E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.434E+31	.580E+31	.000E+00	.000E+00	.910E+31	.569E+31	.651E+30	.208E+32	.209E+32	.757E+31	.000E+00	.000E+00	.000E+00	.748E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.434E+31	.580E+31	.000E+00	.000E+00	.910E+31	.569E+31	.650E+30	.210E+32	.207E+32	.757E+31	.000E+00	.000E+00	.000E+00	.748E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.345E+31	.592E+31	.000E+00	.000E+00	.889E+31	.557E+31	.465E+30	.198E+32	.199E+32	.472E+31	.000E+00	.000E+00	.000E+00	.687E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.242E+31	.653E+31	.000E+00	.000E+00	.923E+31	.579E+31	.232E+30	.195E+32	.203E+32	.924E+30	.000E+00	.000E+00	.000E+00	.649E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.225E+31	.691E+31	.000E+00	.000E+00	.860E+31	.224E+31	.336E+31	.181E+32	.189E+32	.790E+30	.000E+00	.000E+00	.000E+00	.612E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.597E+31	.244E+32	.256E+32	.920E+31	.529E+31	.294E+29	.134E+32	.109E+33	.748E+32	.262E+30	.000E+00	.000E+00	.000E+00	.268E+33
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.146E+30	.425E+32	.120E+33	.141E+33	.516E+32	.373E+32	.656E+32	.899E+32	.723E+33	.139E+33	.000E+00	.000E+00	.000E+00	.141E+34
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.326E+32	.758E+32	.915E+31	.000E+00	.769E+31	.195E+32	.317E+32	.948E+32	.196E+33	.290E+33	.000E+00	.000E+00	.000E+00	.757E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.638E+32	.185E+33	.154E+33	.150E+33	.128E+33	.931E+32	.117E+33	.133E+34	.114E+34	.466E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .383E+34

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : NO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																	TOTAL
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.429E+30	.646E+30	000E+00	.000E+00	.101E+31	.628E+30	.724E+29	.102E+33	.305E+31	.843E+30	.000E+00	.000E+00	.000E+00	.109E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.484E+30	.646E+30	000E+00	.000E+00	.101E+31	.634E+30	.724E+29	.225E+31	.239E+31	.843E+30	.000E+00	.000E+00	.000E+00	.833E+31
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.484E+30	.646E+30	000E+00	.000E+00	.101E+31	.634E+30	.725E+29	.231E+31	.233E+31	.843E+30	.000E+00	.000E+00	.000E+00	.833E+31
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.484E+30	.646E+30	000E+00	.000E+00	.101E+31	.634E+30	.724E+29	.233E+31	.231E+31	.843E+30	.000E+00	.000E+00	.000E+00	.833E+31
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.385E+30	.660E+30	000E+00	.000E+00	.990E+30	.620E+30	.518E+29	.220E+31	.222E+31	.526E+30	.000E+00	.000E+00	.000E+00	.765E+31
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.252E+30	.678E+30	000E+00	.000E+00	.958E+30	.601E+30	.241E+29	.203E+31	.210E+31	.958E+29	.000E+00	.000E+00	.000E+00	.674E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.234E+30	.717E+30	.000E+00	.000E+00	.892E+30	.232E+30	.349E+30	.188E+31	.196E+31	.820E+29	.000E+00	.000E+00	.000E+00	.635E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.620E+30	.254E+31	.266E+31	.955E+30	.549E+30	.305E+28	.139E+31	.113E+32	.776E+31	.272E+29	.000E+00	.000E+00	.000E+00	.278E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.151E+29	.441E+31	.124E+32	.146E+32	.535E+31	.387E+31	.681E+31	.933E+31	.750E+32	.144E+32	.000E+00	.000E+00	.000E+00	.146E+33
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.387E+31	.899E+31	.108E+31	.000E+00	.912E+30	.232E+31	.376E+31	.112E+32	.232E+32	.344E+32	.000E+00	.000E+00	.000E+00	.898E+32
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.726E+31	.206E+32	162E+32	.156E+32	.137E+32	.102E+32	.127E+32	.147E+33	.122E+33	.529E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .418E+33

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.805E+30	.121E+31	.000E+00	.000E+00	.190E+31	.118E+31	.136E+30	.192E+33	.573E+31	.158E+31	.000E+00	.000E+00	.000E+00	.204E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.908E+30	.121E+31	.000E+00	.000E+00	.190E+31	.119E+31	.136E+30	.423E+31	.448E+31	.158E+31	.000E+00	.000E+00	.000E+00	.156E+32
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.908E+30	.121E+31	.000E+00	.000E+00	.190E+31	.119E+31	.136E+30	.434E+31	.437E+31	.158E+31	.000E+00	.000E+00	.000E+00	.156E+32
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.908E+30	.121E+31	.000E+00	.000E+00	.190E+31	.119E+31	.136E+30	.438E+31	.433E+31	.158E+31	.000E+00	.000E+00	.000E+00	.156E+32
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.722E+30	.124E+31	.000E+00	.000E+00	.186E+31	.116E+31	.972E+29	.414E+31	.417E+31	.987E+30	.000E+00	.000E+00	.000E+00	.144E+32
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.649E+30	.175E+31	.000E+00	.000E+00	.247E+31	.155E+31	.622E+29	.523E+31	.543E+31	.247E+30	.000E+00	.000E+00	.000E+00	.174E+32
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.603E+30	.185E+31	.000E+00	.000E+00	.230E+31	.599E+30	.901E+30	.486E+31	.507E+31	.212E+30	.000E+00	.000E+00	.000E+00	.164E+32
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.160E+31	.654E+31	.686E+31	.246E+31	.142E+31	.786E+28	.358E+31	.292E+32	.200E+32	.702E+29	.000E+00	.000E+00	.000E+00	.718E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.390E+29	.114E+32	.321E+32	.377E+32	.138E+32	.998E-31	.176E+32	.241E+32	.194E+33	.372E+32	.000E+00	.000E+00	.000E+00	.378E+33
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.874E+31	.203E+32	.245E+31	.000E+00	.206E+31	.523E+31	.848E+31	.254E+32	.524E+32	.777E+32	.000E+00	.000E+00	.000E+00	.203E+33
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.159E+32	.479E+32	.414E+32	.402E+32	.315E+32	.233E+32	.312E+32	.297E+33	.300E+33	.123E+33	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .951E+33

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : THC
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.932E+28	.251E-29	.000E+00	.000E+00	.355E+29	.223E+29	.893E+27	.751E+29	.780E+29	.355E+28	.000E+00	.000E+00	.000E+00	.250E+30
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.867E+28	.266E+29	.000E+00	.000E+00	.331E+29	.860E+28	.129E+29	.697E+29	.728E+29	.304E+28	.000E+00	.000E+00	.000E+00	.235E+30
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.230E+29	.940E+29	.984E+29	.354E+29	.203E+29	.113E+27	.514E+29	.420E+30	.288E+30	.101E+28	.000E+00	.000E+00	.000E+00	.103E+31
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.560E+27	.163E+30	.460E+30	.542E+30	.198E+30	.143E+30	.252E+30	.346E+30	.278E+31	.535E+30	.000E+00	.000E+00	.000E+00	.542E+31
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.126E+30	.291E+30	.352E+29	.000E+00	.296E+29	.751E+29	.122E+30	.364E+30	.753E+30	.112E+31	.000E+00	.000E+00	.000E+00	.291E+31
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.167E+30	.601E+30	.594E+30	.577E+30	.317E+30	.249E+30	.439E+30	.127E+31	.397E+31	.166E+31	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .985E+31

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : CO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.) -90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.203E+34	.305E+34	.000E+00	.000E+00	.479E+34	.297E+34	.343E+33	.482E+36	.144E+35	.398E+34	.000E+00	.000E+00	.000E+00	.514E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.229E+34	.305E+34	.000E+00	.000E+00	.479E+34	.300E+34	.342E+33	.106E+35	.113E+35	.398E+34	.000E+00	.000E+00	.000E+00	.394E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.229E+34	.305E+34	.000E+00	.000E+00	.479E+34	.300E+34	.343E+33	.109E+35	.110E+35	.398E+34	.000E+00	.000E+00	.000E+00	.394E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.229E+34	.305E+34	.000E+00	.000E+00	.479E+34	.300E+34	.342E+33	.110E+35	.109E+35	.398E+34	.000E+00	.000E+00	.000E+00	.394E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.182E+34	.312E+34	.000E+00	.000E+00	.468E+34	.293E+34	.245E+33	.104E+35	.105E+35	.249E+34	.000E+00	.000E+00	.000E+00	.362E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.119E+34	.321E+34	.000E+00	.000E+00	.453E+34	.284E+34	.114E+33	.958E+34	.995E+34	.453E+33	.000E+00	.000E+00	.000E+00	.319E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.111E+34	.339E+34	.000E+00	.000E+00	.422E+34	.110E+34	.165E+34	.889E+34	.928E+34	.387E+33	.000E+00	.000E+00	.000E+00	.300E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.293E+34	.120E+35	.126E+35	.451E+34	.259E+34	.144E+32	.656E+34	.535E+35	.367E+35	.129E+33	.000E+00	.000E+00	.000E+00	.132E+36
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.715E+32	.208E+35	.587E+35	.691E+35	.253E+35	.183E+35	.322E+35	.441E+35	.355E+36	.682E+35	.000E+00	.000E+00	.000E+00	.692E+36
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.160E+35	.372E+35	.449E+34	.000E+00	.377E+34	.958E+34	.155E+35	.465E+35	.960E+35	.142E+36	.000E+00	.000E+00	.000E+00	.371E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.320E+35	.919E+35	.758E+35	.736E+35	.643E+35	.467E+35	.577E+35	.688E+36	.565E+36	.230E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .192E+37

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : H_2O
TOTAL ANNUAL EMISSIONS IN MOLECULES

ALTITUDE RANGE (KM.)	LATITUDE BAND (DEG.)																		TOTAL
	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.193E+34	.290E+34	.000E+00	.000E+00	.456E+34	.282E+34	.326E+33	.459E+36	.137E+35	.379E+34	.000E+00	.000E+00	.000E+00	.489E+36
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.218E+34	.290E+34	.000E+00	.000E+00	.456E+34	.285E+34	.326E+33	.101E+35	.107E+35	.379E+34	.000E+00	.000E+00	.000E+00	.375E+35
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.218E+34	.290E+34	.000E+00	.000E+00	.456E+34	.285E+34	.326E+33	.104E+35	.105E+35	.379E+34	.000E+00	.000E+00	.000E+00	.375E+35
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.218E+34	.290E+34	.000E+00	.000E+00	.456E+34	.285E+34	.326E+33	.105E+35	.104E+35	.379E+34	.000E+00	.000E+00	.000E+00	.375E+35
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.173E+34	.297E+34	.000E+00	.000E+00	.445E+34	.279E+34	.233E+33	.991E+34	.998E+34	.236E+34	.000E+00	.000E+00	.000E+00	.344E+35
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.113E+34	.305E+34	.000E+00	.000E+00	.431E+34	.270E+34	.108E+33	.911E+34	.946E+34	.431E+33	.000E+00	.000E+00	.000E+00	.303E+35
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.105E+34	.323E+34	.000E+00	.000E+00	.401E+34	.104E+34	.157E+34	.846E+34	.883E+34	.369E+33	.000E+00	.000E+00	.000E+00	.286E+35
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.279E+34	.114E+35	.119E+35	.429E+34	.247E+34	.137E+32	.624E+34	.509E+35	.349E+35	.122E+33	.000E+00	.000E+00	.000E+00	.125E+36
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.680E+32	.198E+35	.559E+35	.658E+35	.241E+35	.174E+35	.306E+35	.420E+35	.337E+36	.649E+35	.000E+00	.000E+00	.000E+00	.658E+36
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.152E+35	.354E+35	.427E+34	.000E+00	.359E+34	.912E+34	.148E+35	.442E+35	.913E+35	.135E+36	.000E+00	.000E+00	.000E+00	.353E+36
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.305E+35	.875E+35	.721E+35	.700E+35	.611E+35	.444E+35	.548E+35	.654E+36	.537E+36	.219E+36	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .183E+37

MACH 1.6 WITH P & W RBQQ/TBE
8/7/90
CONSTITUENT : SO_2
TOTAL ANNUAL EMISSIONS IN MOLECULES

	LATITUDE BAND (DEG.)																	
ALTITUDE RANGE (KM.)	-90/-80	-80/-70	-70/-60	-60/-50	-50/-40	-40/-30	-30/-20	-20/-10	-10/00	00/10	10/20	20/30	30/40	40/50	50/60	60/70	70/80	80/90	TOTAL
0.0 - 2.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.440E+30	.662E+30	.000E+00	.000E+00	.104E+31	.644E+30	.743E+29	.105E+33	.313E+31	.864E+30	.000E+00	.000E+00	.000E+00	.112E+33
2.0 - 4.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.496E+30	.662E+30	.000E+00	.000E+00	.104E+31	.650E+30	.743E+29	.231E+31	.245E+31	.864E+30	.000E+00	.000E+00	.000E+00	.855E+31
4.0 - 6.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.496E+30	.662E+30	.000E+00	.000E+00	.104E+31	.650E+30	.743E+29	.237E+31	.239E+31	.864E+30	.000E+00	.000E+00	.000E+00	.855E+31
6.0 - 8.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.496E+30	.662E+30	.000E+00	.000E+00	.104E+31	.650E+30	.743E+29	.239E+31	.237E+31	.864E+30	.000E+00	.000E+00	.000E+00	.855E+31
8.0 - 10.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.395E+30	.677E+30	.000E+00	.000E+00	.102E+31	.636E+30	.531E+29	.226E+31	.228E+31	.539E+30	.000E+00	.000E+00	.000E+00	.785E+31
10.0 - 12.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.258E+30	.695E+30	.000E+00	.000E+00	.983E+30	.617E+30	.247E+29	.208E+31	.216E+31	.983E+29	.000E+00	.000E+00	.000E+00	.691E+31
12.0 - 14.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.240E+30	.736E+30	.000E+00	.000E+00	.915E+30	.238E+30	.358E+30	.193E+31	.201E+31	.841E+29	.000E+00	.000E+00	.000E+00	.651E+31
14.0 - 16.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.636E+30	.260E+31	.272E+31	.979E+30	.563E+30	.313E+28	.142E+31	.116E+32	.796E+31	.279E+29	.000E+00	.000E+00	.000E+00	.285E+32
16.0 - 18.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.155E+29	.452E+31	.127E+32	.150E+32	.549E+31	.397E+31	.698E+31	.957E+31	.770E+32	.148E+32	.000E+00	.000E+00	.000E+00	.150E+33
18.0 - 20.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.348E+31	.807E+31	.974E+30	.000E+00	.819E+30	.208E+31	.337E+31	.101E+32	.208E+32	.309E+32	.000E+00	.000E+00	.000E+00	.806E+32
20.0 - 22.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22.0 - 24.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24.0 - 26.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26.0 - 28.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
28.0 - 30.0	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
TOTAL	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.695E+31	.199E+32	.164E+32	.160E+32	.139E+32	.101E+32	.125E+32	.149E+33	.123E+33	.499E+32	.000E+00	.000E+00	.000E+00	ANNUAL TOTAL .418E+33

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15. Supplementary Notes

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HIGH SPEED CIVIL TRANSPORTS

16. Abstract

The input for global atmospheric chemistry models has been generated for baseline HSCT configurations at Mach 1.6, 2.2, and 3.2. The input is supplied in the form of number of molecules of specific exhaust constituents injected into the atmosphere per year by latitude and by altitude (for 2-D codes). Seven exhaust constituents are currently supplied - NO, NO_2 CO, CO_2, H_2O, SO_2, and THC (trace hydrocarbons). An eighth input is also supplied, NO_x, which is the sum of NO and NO_2. The number of molecules of a given constituent emitted per year is a function of the total fuel burned by a supersonic fleet and the emissions index (EI) of the aircraft engine for the constituent in question. The emissions indices for an engine are supplied directly by the engine manufacturer. The annual fuel burn of a supersonic fleet is calculated from aircraft performance and economic criteria, both of which are strongly dependent on basic design parameters such as speed and range. The altitude and latitude distribution of the emissions is determined based on 10 IATA regions chosen to define the worldwide route structure for future HSCT operations and the mission flight profiles for the city-pairs representing each of the 10 regions.

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